

REMARKS

The Examiner's Office Action of **December 19, 2001** has been received and its contents carefully noted. Applicant respectfully submits that this response is timely filed and fully responsive to the Office Action. Claims 1-20 were pending in this application prior to the aforementioned amendment. By the above actions, claims 1 and 20 are amended merely for clarification purposes, and not for reasons related to patentability. Applicant respectfully submits that no issue of new matter is presented by the amendment to claims 1 and 20. Accordingly, claims 1-20 remain pending in this application, and are believed to be in condition for allowance for at least the reasons stated below.

A. 35 U.S.C. §103 Rejection

The Examiner rejects claims 1-4, 9, 14 and 15 under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 5,769,668 to **Tondreault** in view of U.S. Patent 4,761,140 to **Geib**, claims 5, 6, 10, 11, 16, 17 and 20 under 35 U.S.C. §103(a) as unpatentable over **Tondreault** and **Geib**, and further in view of U.S. Patent 5,648,890 to **Loo et al.** (Hereinafter "**Loo**"), and claims 7, 8, 12, 13, 18 and 19 under 35 U.S.C. §103(a) as unpatentable over **Tondreault** and **Geib**, and further in view of U.S. Patent 6,246,583 to **Cronin et al.** (Hereinafter "**Cronin**"). Notwithstanding the fact that independent claims 1 and 20 are amended in order to more clearly define the invention, the rejections are respectfully traversed for at least the foregoing reasons.

The claimed invention is directed to a connector for connecting a module to a printed circuit board, the connector including, *inter alia*, a connector body having a receiving part that extends along the front side of the module when the module is in a connection position, and a lateral supporting part that extends rearward from the receiving part to support a left side, a right side and a bottom of the module in the connection position, and a metallic cover pivotably connected to the connector body and movable to a position that sandwiches the

module between the metallic cover and the supporting part to thereby maintain the module in the connection position.

In accordance with claim 1, the metallic cover includes a first connection means for connection to the receiving part of the connector body and a second connection means for connection to the lateral supporting part of the connector body. In accordance with claim 20, the metallic cover includes a window for exposing a semiconductor chip of the printed circuit board when the module is placed in the connection position, and a heat sink secured to the metallic cover to contact the semiconductor chip and dissipate heat therefrom.

It is respectfully contended that the proposed combination of *Tondreault*, either alone or in combination with *Geib*, *Loo*, or *Cronin*, fails to render the claimed invention obvious since it clearly fails to expressly teach or remotely suggest each and every claimed feature thereof.

For instance, in the Office Action, the Examiner finds that *Tondreault* discloses a connector body (10) having a receiving part (14), a supporting part (24, 26) and a positioning mechanism (28, 30). The Examiner readily concedes, however, that *Tondreault* fails to disclose a metallic cover or a metallic cover having a heat sink.

Consequently, *Geib* is cited in order to modify *Tondreault*, the Examiner contending that *Geib* discloses “a hinged, removable metallic cover (14) including first connection means (102) and second connection means (98), to keep a module in place.” Moreover, the Examiner cites *Loo* in order to modify the proposed *Tondreault-Geib* combination since *Loo* allegedly discloses “a cover (16) having a window (38) and a heat sink (20) in the window covering a conductive member (12) to dissipate heat from the conductive member.”

Applicant traverses this finding in contending that *Geib* clearly lacks an express or implicit teaching that renders the metallic cover as defined in claim 1 *prima facie* obvious. In particular, there is no showing, either expressly or implicitly, in the teachings of *Geib*, of a metallic cover that includes the combination of: (1) a first connection means for connection

to a receiving part of the connector body, and (2) a second connection means for connection to a lateral supporting part of the connector body. As clearly illustrated in Figs. 6 of *Geib*, both the first connection means (102) and the second connection means (98) are connected to a lateral wall of the socket body (12).

On the other hand, the claimed invention in accordance with claim 1 requires that the metallic cover form a connection with two separate walls of the connector body. See, Figs. 21-23 of the subject application. In particular, claim 1 requires only that the second connection means form a connection with a lateral supporting part of the connector body, while the first connection means forms a connection with a receiving part of the connector body, the lateral supporting part extending in a path rearward of the receiving part. Such a feature is non-obviously advantageous in that it permits switchover between the insertion/withdrawal position and the connection position of the of the module in a single step.

Such features are not remotely shown in *Geib*, and thus, the aforementioned benefits of having such a structure cannot be achieved since *Geib* shows two separate points of attachment (98, 102) on the same side of the socket body (12). Therefore, even if *Geib* were properly combined with *Tondreault*, the claimed invention in accordance with claim 1 would not result in that the combination lacks a metallic cover having the above-noted features.

Applicant traverses the citation of *Loo* since *Loo* clearly lacks several features set forth in the metallic cover defined in the claimed invention. For instance, while the Examiner describes *Loo* as disclosing "a cover (16) having...a heat sink (20)," there is no such disclosure throughout the entire *Loo* patent. The cover (16) and the heat sink (20) of *Loo* are two entirely separate structures, not a single structure as is required in the claimed invention. On the other hand, claim 20 requires that the heat sink be secured to the metallic cover in order to contact the semiconductor chip and dissipate heat therefrom. Therefore, *Loo* is deficient for failing to disclose an integral cover-heat sink structure, such as that

which is claimed at least in claim 20 of the present invention.

Moreover, there is nothing in *Loo* that remotely suggests that the cover (16) can be modified to include a heat sink. This fact is further enhanced in that the cover (16) of *Loo* is not composed of a metallic material. In particular, *Loo* discloses that the cover (16) "is made of a well known polymer material, such as polphenylene sulfide." It is well known throughout the art that polymers do not act as thermal conductors, and thus, are not desired when it is required that a component function in high thermal load environments.

Metals, on the other hand, are widely used as thermal conductors since they have excellent high temperature properties. This fact is admitted by *Loo*, whom expressly teaches that "the heat sink 20 is made of a well known thermal conductive material, such as aluminum or copper." Col. 4, lines 13-16. In this regard, one of the stated advantageous features of composing the cover of the claimed invention of a metal is that it serves to prevent defective connections/disconnections of the module due to thermal load on the connector body and its elastic deformation. Consequently, one of ordinary skill in the art would not look to the polymeric cover (16) of *Loo* to achieve the claimed invention since it is incapable of functioning in a high heat environment, and thus, would frustrate the purpose of the cover. Meaning, the polymeric cover (16) described in *Loo* is not suitable for the purpose in which the cover in the claimed invention is required. Accordingly, the polymeric cover (16) of *Loo* would render the modified device of *Tondreault* and *Geib* unsuitable for its intended purpose. It has been held that if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Accordingly, inasmuch as *Loo* discloses a polymeric cover, its combination with *Tondreault* and *Geib* is improper for lack suggestion or motivation for the combination.

Regarding the rejection of claims 7, 8, 12, 13, 18 and 19, inasmuch as the combined

teachings of *Tondreault* and *Geib* fail to teach each and every feature of the invention, their combination with *Cronin* would still fail to render these claims *prima facie* obvious. Accordingly, reconsideration and withdrawal of the rejections is earnestly solicited.

Conclusion

Accordingly, since the claimed invention clearly defines over the prior art of record, Applicant respectfully contends that the pending claims are in condition for allowance. Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,
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DRS/TAV



Marked up copy of amended claims

1. (Thrice Amended) A connector for a module that connects the module, the module having a semiconductor chip mounted on a rectangular board and a conductive pad on a front side of the board, to a printed circuit board in a position wherein a plane of the board is substantially parallel to the printed circuit board,

said connector comprising:

a connector body having a receiving part that extends along the front side of the module being in a connection position, and a groove provided in a rear face thereof into which the front side of the module is inserted, said groove having contacts provided therein which contact the conductive pad on both a top surface and a bottom surface of the module when the module is placed in an insertion/withdrawal position while allowing the pad to shift in a direction of insertion/withdrawal when the module is in the insertion/withdrawal position in which the rear side of the module is at a higher level than in the connection position, and [having] a lateral supporting part that extends rearward from the receiving part to support a left side, a right side and a bottom of the module in the connection position; and

a metallic cover including a first connection means for connection to said receiving part of said connector body and a second connection means for connection to said lateral supporting part[;],

wherein said metallic cover is put over and is engaged to the connector body to sandwich the module between said metallic cover and the supporting part to thereby maintain the module in the connection position.

20. (Twice Amended) A connector for a module that connects the module, the module having a semiconductor chip mounted on a rectangular board and a conductive pad on a front side of the board, to a printed circuit board in a position wherein a plane of the board is substantially parallel to the printed circuit board,



said connector comprising:

a connector body having a receiving part that extends along the front side of the module being in a connection position, and a groove provided in a rear face thereof into which the front side of the module is inserted, said groove having contacts provided therein which contact the conductive pad on both a top surface and a bottom surface of the module when the module is placed in an insertion/withdrawal position while allowing the pad to shift in a direction of insertion/withdrawal when the module is in the insertion/withdrawal position in which the rear side of the module is at a higher level than in the connection position, and [having] a supporting part that extends rearward from the receiving part to support a left side, a right side and a bottom of the module in the connection position;

a metallic cover that is put over and is engaged with the connector body to sandwich the module between said metallic cover and the supporting part to thereby maintain the module in the connection position, said metallic cover including a window for exposing the semiconductor chip when the module is placed in the connection position, and a heat sink secured to said metallic cover and contacts the semiconductor chip to dissipate heat therefrom,

wherein at least one of said metallic cover and said heat sink covers said contacts and the conductive pad to exhibit a shielding function against electromagnetic waves.